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S10	23	((optical or character or pattern or signal or image or facial or biometric) adj2 recognition) and S9	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/24 16:54
S11	96	((optical or character or pattern or signal or image or facial or biometric) adj2 recognition) and labview	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/24 17:12

S12	10	S11 and S9	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/24 17:07
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S14	0	"4901221.did"	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/24 17:27
S15	0	"4901221.did."	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/24 17:27
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S17	1	"4901221".pn. and (input or inputs or inputting or enter or enters or entering) and (graphics or graphic or graphical) and (flowchart or flowcharts or diagram or diagrams)	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/24 17:30
S18	1	"4901221".pn. and (input or inputs or inputting or enter or enters or entering) and (graphics or graphic or graphical) and (flowchart or flowcharts or diagram or diagrams) and (code or codes or execute or executable)	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/24 17:30
S19	1	(US-4901221-$).did.	USPAT	OR	OFF	2005/08/29 09:35
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S22	19	(US-20020165876-$).did. or (US-4901221-$ or US-4914568-$ or US-5291587-$ or US-5301301-$ or US-5301336-$ or US-5353233-$ or US-5371851-$ or US-5475851-$ or US-5481740-$ or US-5481741-$ or US-5504917-$ or US-5574639-$ or US-5832468-$ or US-5859964-$ or US-5910905-$ or US-6660042-$ or US-6665422-$ or US-6757428-$). did.	US-PGPUB; USPAT	OR	OFF	2005/08/29 11:52
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S25	1	(US-5353233-$).did.	USPAT	OR	OFF	2005/08/29 12:59
S26	1	S25 and ((pattern or image or signal or text or character or digit or voice or face or facial) adj2 (identification or recognition))	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/29 13:05
S27	1	S25 and ((pattern or image or signal or text or character or digit or voice or face or facial) adj2 (identification or recognition)) and labview	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/29 13:05
S28	1	"4992649".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/29 16:15
S29	1	"5031223".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/29 16:16
S30	1	"6665422".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2005/08/29 16:16
S31	3	("6665422").URPN.	USPAT	OR	OFF	2005/08/29 16:16
S32	3	("6665422").URPN.	USPAT	OR	OFF	2005/08/29 16:18

S33	5	("4992649" | "5031223" | "5311999" | "5754671" | "6239397").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/08/29 16:19
S34	3	("4632252" | "4832204" | "4845761").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/08/29 16:23
S35	4	("3271738" | "3582884" | "4068212").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/08/29 16:24
S36	58	("5031223").URPN.	USPAT	OR	OFF	2005/08/29 16:25
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☐   **1. Computation of three-dimensional rigid-body dynamics with multiple unil using time-stepping and Gauss-Seidel methods**
Tong Liu; Wang, M.Y.;
Automation Science and Engineering, IEEE Transactions on [see also Robotic Automation, IEEE Transactions on]
Volume 2, Issue 1, Jan. 2005 Page(s):19 - 31
Digital Object Identifier 10.1109/TASE.2004.840074

<u>AbstractPlus</u> | <u>References</u> | Full Text: <u>PDF</u>(744 KB)   IEEE JNL

☐   **2. A parallel Gauss-Seidel algorithm for sparse power system matrices**
Koester, D.P.; Ranka, S.; Fox, G.C.;
Supercomputing '94. Proceedings
14-18 Nov. 1994 Page(s):184 - 193
Digital Object Identifier 10.1109/SUPERC.1994.344278

<u>AbstractPlus</u> | Full Text: <u>PDF</u>(732 KB)   IEEE CNF

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Burch, R.; Yang, P.; Cox, P.; Mayaram, K.;
Computer-Aided Design of Integrated Circuits and Systems, IEEE Transaction:
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Spasov, V.; Noguchi, S.; Yamashita, H.;
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Kushner, H.J.;
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25. **Combined echo and noise cancellation based on Gauss-Seidel pseudo a algorithm**
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1 A distributed memory unstructured gauss-seidel algorithm for multigrid smoothers   ■
Mark F. Adams
November 2001 **Proceedings of the 2001 ACM/IEEE conference on Supercomputing (CDROM)**

Full text available: 🔲 pdf(1.08 MB)   Additional Information: full citation, abstract, references, citings, index terms

Gauss-Seidel is a popular multigrid smoother as it is provably optimal on structured grids and exhibits superior performance on unstructured grids. Gauss-Seidel is not used to our knowledge on distributed memory machines as it is not obvious how to parallelize it effectively. We, among others, have found that Krylov solvers preconditioned with Jacobi, block Jacobi or overlapped Schwarz are effective on unstructured problems. Gauss-Seidel does however have some attractive properties, namely: fast ...

Keywords: algebraic multigrid, parallel gauss-seidel, parallel graph algorithms, unstructured multigrid

2 Session 7: linear algebra I: A parallel Gauss-Seidel algorithm for sparse power system   ■
matrices
D. P. Koester, S. Ranka, G. C. Fox
November 1994 **Proceedings of the 1994 ACM/IEEE conference on Supercomputing**

Full text available: 🔲 pdf(881.71 KB)   Additional Information: full citation, abstract, references

We describe the implementation and performance of an efficient parallel Gauss-Seidel algorithm that has been developed for irregular, sparse matrices from electrical power systems applications. Although, Gauss-Seidel algorithms are inherently sequential, by performing specialized orderings on sparse matrices, it is possible to eliminate much of the data dependencies caused by precedence in the calculations. A two-part matrix ordering technique has been developed -- first to partition the matrix ...

3 A parallel Gauss-Seidel algorithm for sparse power system matrices   ■
D. P. Koester, S. Ranka, G. C. Fox
December 1994 **Proceedings of the 1994 conference on Supercomputing**

Full text available: 🔲 pdf(898.02 KB)   Additional Information: full citation, abstract, references, citings, index terms

We describe the implementation and performance of an efficient parallel Gauss-Seidel

algorithm that has been developed for irregular, sparse matrices from electrical power systems applications. Although, Gauss-Seidel algorithms are inherently sequential, by performing specialized orderings on sparse matrices, it is possible to eliminate much of the data dependencies caused by precedence in the calculations. A two-part matrix ordering technique has been developed—first to partition the ...

4 Parallel multigrid smoothing: polynomial versus Gauss--Seidel
Mark Adams, Marian Brezina, Jonathan Hu, Ray Tuminaro
July 2003 **Journal of Computational Physics**, Volume 188 Issue 2

Additional Information: full citation, abstract, references, index terms

Gauss-Seidel is often the smoother of choice within multigrid applications. In the context of unstructured meshes, however, maintaining good parallel efficiency is difficult with multiplicative iterative methods such as Gauss-Seidel. This leads us to consider alternative smoothers. We discuss the computational advantages of polynomial smoothers within parallel multigrid algorithms for positive definite symmetric systems. Two particular polynomials are considered: Chebyshev and a multilevel speci ...

Keywords: Gauss-Seidel, multigrid, parallel computing, polynomial iteration, smoothers

5 Memory characteristics of iterative methods
Christian Weiß, Wolfgang Karl, Markus Kowarschik, Ulrich Rüde
January 1999 **Proceedings of the 1999 ACM/IEEE conference on Supercomputing (CDROM)**
Full text available: pdf(438.45 KB)   Additional Information: full citation, references, citings, index terms

6 Computational geometry: a retrospective
Bernard Chazelle
May 1994 **Proceedings of the twenty-sixth annual ACM symposium on Theory of computing**
Full text available: pdf(2.20 MB)   Additional Information: full citation, references, citings, index terms

7 Voronoi diagrams—a survey of a fundamental geometric data structure
Franz Aurenhammer
September 1991 **ACM Computing Surveys (CSUR)**, Volume 23 Issue 3

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Keywords: cell complex, clustering, combinatorial complexity, convex hull, crystal structure, divide-and-conquer, geometric data structure, growth model, higher dimensional embedding, hyperplane arrangement, k-set, motion planning, neighbor searching, object modeling, plane-sweep, proximity, randomized insertion, spanning tree, triangulation

8 Polar forms for geometrically continuous spline curves of arbitrary degree
Hans-Peter Seidel
January 1993 **ACM Transactions on Graphics (TOG)**, Volume 12 Issue 1

Full text available: pdf(1.49 MB)   Additional Information: full citation, references, index terms

Keywords: &bgr;-spline, B-spline, Be´zier point, Blossom, connection matrix, control point, de Boor algorithm, geometric continuity, knot insertion, knot vector, osculating flat, polar form, spline control point, universal spline

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9 Sparse Tiling for Stationary Iterative Methods

Michelle Mills Strout, Larry Carter, Jeanne Ferrante, Barbara Kreaseck

February 2004 **International Journal of High Performance Computing Applications,**
Volume 18 Issue 1

Additional Information: full citation, abstract, references

In modern computers, a program's data locality can affect performance significantly. This paper details *full sparse tiling*, a run-time reordering transformation that improves the data locality for stationary iterative methods such as Gauss-Seidel operating on sparse matrices. In scientific applications such as finite element analysis, these iterative methods dominate the execution time. Full sparse tiling chooses a permutation of the rows and columns of the sparse matrix, and then an o ...

Keywords: computer architecture, data locality, irregular grids, iterative alogorithms, sparse matrix, static and dynamic analysis, tiling

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10 A Schwarz splitting variant of cubic spline collocation methods for elliptic PDEs

E. N. Houstis, J. R. Rice, E. A. Vavalis

January 1989 **Proceedings of the third conference on Hypercube concurrent computers and applications - Volume 2**

Full text available: 📄 pdf(660.19 KB)   Additional Information: full citation, abstract, references, citings, index terms

We consider the formulation of the Schwarz alternating method for a new class of elliptic cubic spline collocation discretization schemes. The convergence of the method is studied using Jacobi and Gauss-Seidel iterative methods for implementing the interaction among subdomains. The Schwarz Cubic Spline Collocation (SCSC) method is formulated for hypercube architectures and implemented on the NCUBE (128 processors) machine. The performance and convergence of the hypercube SCSC algorithm is s ...

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11 Reliable computations and their applications (RCA): On considering an interval constraint solving algorithm as a free-steering nonlinear Gauss-Seidel procedure

Frédéric Goualard

March 2005 **Proceedings of the 2005 ACM symposium on Applied computing**

Full text available: 📄 pdf(280.36 KB)   Additional Information: full citation, abstract, references, index terms

We show that a classical interval constraint propagation algorithm enforcing box consistency may be interpreted as a free-steering nonlinear Gauss-Seidel procedure. This suggests that the choice of a transversal in the incidence matrix associated with the problem to solve is paramount to the efficiency of the algorithm. We present experimental evidences that it is indeed so, and we suggest an heuristics to compute good transversals. The improved interval constraint algorithm is compared with a c ...

Keywords: branch-and-prune method, constraint, nonlinear system

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12 An accelerated Gauss--Seidel method for inverse modeling

T. M. Ng, B. Farhang-Boroujeny, H. K. Garg

March 2003 **Signal Processing,** Volume 83 Issue 3

Additional Information: full citation, abstract, references, index terms

Inverse modeling is an application for adaptive filters that has found extensive use in many engineering disciplines. In this paper, we consider the problem of finding reverse models in the area of channel equalization, and adaptive control systems. First, the problem is formulated in a general setting as a standard least squares problem. With this, the inverse model can be found using any one of the many well established least squares methods. One such method is the classical Gauss-Seidel metho ...

Keywords: Gauss-Seidel method, SOR method, adaptive control system, channel equalizer, linear acceleration

13 Parallel triangular decompositions of an oil refining simulation

Xiaodong Zhang

August 1993 **Proceedings of the 7th international conference on Supercomputing**

Full text available: pdf(856.77 KB)   Additional Information: full citation, abstract, references, index terms

One important process in oil refining is to separate the crude oil into various oil products. This process is called distillation. In designing a complex distillation column, a large computer simulation is conducted. This paper presents our experience with parallelizing an oil refining simulation application that computes the composition of the various oil products in designed refining columns operated under a given set of conditions. Mathematical models for the simulation ...

14 Virtual path bandwidth allocation in multiuser networks

Aurel A. Lazar, Ariel Orda, Dimitrios E. Pendarakis

December 1997 **IEEE/ACM Transactions on Networking (TON)**, Volume 5 Issue 6

Full text available: pdf(324.16 KB)   Additional Information: full citation, references, citings, index terms

Keywords: Nash equilibrium, bandwidth allocation, distributed algorithms, game theory, network control, virtual path

15 Programming languages and object technologies: On optimal temporal locality of stencil codes

Claudia Leopold

March 2002 **Proceedings of the 2002 ACM symposium on Applied computing**

Full text available: pdf(433.74 KB)   Additional Information: full citation, abstract, references, citings, index terms

Iterative solvers such as the Jacobi and Gauss-Seidel relaxation methods are important, but time-consuming building blocks of many scientific and engineering applications. The performance problems are largely due to cache misses, and can be reduced by tiling the codes. Whereas previous research has shown the usefulness of tiling by experimentally comparing the run times of tiled and original codes, it did not tackle the question as to whether further improvements are possible. In this paper, we ...

Keywords: data locality, lower bounds, relaxation methods, tiling

16 Image-based reconstruction of spatial appearance and geometric detail

Hendrik P. A. Lensch, Jan Kautz, Michael Goesele, Wolfgang Heidrich, Hans-Peter Seidel

April 2003 **ACM Transactions on Graphics (TOG)**, Volume 22 Issue 2

Full text available: ▓ pdf(302.22 KB)   Additional Information: full citation, abstract, references, citings, index terms

Real-world objects are usually composed of a number of different materials that often show subtle changes even within a single material. Photorealistic rendering of such objects requires accurate measurements of the reflection properties of each material, as well as the spatially varying effects. We present an image-based measuring method that robustly detects the different materials of real objects and fits an average bidirectional reflectance distribution function (BRDF) to each of them. In or ...

Keywords: BRDF measurement, normal map acquisition, photometric stereo, shape from shading, spatially varying BRDFs

17 Modeling and animating hands & bodies: Construction and animation of anatomically based human hand models
Irene Albrecht, Jörg Haber, Hans-Peter Seidel
July 2003 **Proceedings of the 2003 ACM SIGGRAPH/Eurographics symposium on Computer animation SCA '03**

Full text available: ▓ pdf(7.55 MB)   Additional Information: full citation, abstract, references, citings, index terms

The human hand is a masterpiece of mechanical complexity, able to perform fine motor manipulations and powerful work alike. Designing an animatable human hand model that features the abilities of the archetype created by Nature requires a great deal of anatomical detail to be modeled. In this paper, we present a human hand model with underlying anatomical structure. Animation of the hand model is controlled by muscle contraction values. We employ a physically based hybrid muscle model to convert ...

18 Interactive global illumination: Interactive global illumination using selective photon tracing
Kirill Dmitriev, Stefan Brabec, Karol Myszkowski, Hans-Peter Seidel
July 2002 **Proceedings of the 13th Eurographics workshop on Rendering EGRW '02**

Full text available: ▓ pdf(6.89 MB)   Additional Information: full citation, abstract, references, citings, index terms

We present a method for interactive global illumination computation which is embedded in the framework of Quasi-Monte Carlo photon tracing and density estimation techniques. The method exploits temporal coherence of illumination by tracing photons selectively to the scene regions that require illumination update. Such regions are identified with a high probability by a small number of the pilot photons. Based on the pilot photons which require updating, the remaining photons with similar paths i ...

19 Shading and shaders: Efficient rendering of spatial bi-directional reflectance distribution functions
David K. McAllister, Anselmo Lastra, Wolfgang Heidrich
September 2002 **Proceedings of the ACM SIGGRAPH/EUROGRAPHICS conference on Graphics hardware**

Full text available: ▓ pdf(2.80 MB)   Additional Information: full citation, abstract, references, citings, index terms

We propose texture maps that contain at each texel all the parameters of a Lafortune representation BRDF as a compact, but quite general surface appearance representation. We describe a method for rendering such surfaces rapidly on current graphics hardware and demonstrate the method with real, measured surfaces and hand-painted surfaces.We also propose a method of rendering such spatial bi-directional reflectance distribution functions using prefiltered environment maps. Only one set of maps is ...

Keywords: graphics hardware, reflectance & shading models, rendering hardware, texture mapping

20 A comparison of numerical techniques in Markov modeling

William J. Stewart

February 1978 **Communications of the ACM**, Volume 21 Issue 2

Full text available: 📄 pdf(931.28 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index terms</u>

This paper presents several numerical methods which may be used to obtain the stationary probability vectors of Markovian models. An example of a nearly decomposable system is considered, and the results obtained by the different methods examined. A post mortem reveals why standard techniques often fail to yield the correct results. Finally, a means of estimating the error inherent in the decomposition of certain models is presented.

Keywords: Markov models, near-decomposability, numerical techniques, simultaneous iteration

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